REMARKS

Claims 1-3, and 5-29 are pending in the application.

Independent claim 1 is amended above to among other features include the feature of dependent claim 4 and claim 4 has been cancelled from the application. In addition, the Applicant has amended claim 1, by directing the liner to an oil and gas well shaped charge perforator and the Applicant has broadened claim 1 such that there may be two or more than two metals present in the reactive composition. Basis for this amendment may be found on at least page 4, lines 16 to 21 of the specification. The Applicant has further amended claim 1 by removing the limitation that the composition is "stoichiometric". There is basis for this amendment at least at page 5, lines 34 to 35, of the published PCT application.

Claims 6 and 26 are amended to correct a typographical error and claim dependency error respectively.

New claims 29-30 are added to the application.

No new matter has been added to the application by way of these specification and claim amendments.

I. THE CLAIM 6 OBJECTION

The examiner objected to claim 6 for lacking a period at its end.

Claim 6 is amended above to add a period.

II. THE SECTION 112, SECOND PARAGRAPH REJECTION

The examiner rejected claims 14-15 and 17 allegedly because the claims included broad range of limitation together with a narrow range of limitation that falls within the broad range of limitations. The examiner's rejection is traversed because the limitations are not found in the same claim as alleged by the examiner.

As an initial matter, the examiner is reminded that each claim, whether independent or dependent, are unique claims. As a result, none of claims 13-14 or 17 include two conflicting ranges "in the same claim". Indeed, MPEP section 2173.05(c) expressly allows the type of claims presented by the applicant. Section 2173.05(c) states:

> " it is not improper under 35 U.S.C. 112, second paragraph to present a dependent claim that sets forth a narrower range for an element than the range set

forth in the claim from which it depends. For example, if claim 1 reads 'A circuit ... wherein the resistance is 70-150 ohms .' and claim 2 reads 'The circuit of claim 1 wherein the resistance is 70-150 ohms.', then claim 2 should not be rejected as indefinite."

The applicant asks the examiner to withdraw the rejection of claims 14-15 and 17 for indefiniteness because the claim ranges appear in different claims and because the claims are in the format that the MPEP indicates should not be rejected as indefinite.

The examiner's rejection of claim 26 for being indefinite is overcome by amending claim 26 to depend upon claim 23.

III. TRAVESRSE OF THE ANTICIPATION REJECTION

The examiner rejected claims 1-4, 13 and 19-27 for lacking novelty over Winter *et al* (USP 4766913). Applicant notes that there appears to be an error in the examiner's identification of the patent number for the Winter *et al* reference in the body of the Office Action. The Applicant presumes that the examiner was referring to Winter *et al* (US 476613) which is consistent with the examiner's identification of the reference in the Notice of References Cited attached to the Office Action. The examiner's rejection is traversed on the basis that Winter *et al* fails to disclose a number of claim features.

Winter *et al* is directed to a composite liner formed from two layers, and comprises an inner layer 30 and an outer layer 32. Winter *et al* is clearly directed to providing a liner, (inner layer), that has a highly uniform grain structure, in order to improve the performance of a jet. The highly uniform grain structure is achieved by depositing the "inner" layer onto a smooth substrate (the outer layer).

In contrast, the Applicant's invention is directed to a reactive perforator, i.e. one which possesses a chemical energy component, i.e. undergoes an exothermic reaction, in addition to the usual kinetic energy effect from a shaped charge jet. Winter *et al* is completely silent on the concept of providing a liner which is capable of undergoing a chemical reaction within said composite liner. In particular, all rejected claims are novel because Winter *et al* does not disclose at least the following features of independent claim 1:

- a liner that is a pressed particular composition;
- a liner that includes at least two metals; and

- a liner that includes the at least two metals provided in respective proportions calculated to give an electron concentration of 1.5.

A. Claims 1-4, 13 And 19-27 Are Novel Because Winter Does Not Disclose A Liner That Is "A Pressed Particulate Composition Of Independent Claim 1

Independent claim 1 is amended above to include the claim 4 feature whereby the liner is "a pressed particulate composition". Despite the examiner's position to the contrary, this feature is not disclosed by Winter *et al.*

The examiner cites to Winter *et al*, column 3, lines 41 to 57 for disclosing a pressed particulate composition. The cited Winter *et al* excerpt does not disclose a "pressed particulate composition" as claimed. Instead, the excerpt refers to Winter *et al* inner layer 30 as a fine grained electrodeposited coating on the outer layer. There is absolutely no disclosure that Winter *et al* inner layer 30 is prepared from a pressed particulate composition, i.e. one in which loose metal powders have been mixed and consolidated under high pressures. The only disclosure in Winter *et al* of a "particulate" of any kind is at col. 3, lines 25-26, which states that the deposited materials preferably posses a fine grain structure. The grain structure is created by the "deposition" and not by the consolidation of metal powders. Examples of useful deposition processes are detailed in Winter *et al* at col 3, lines 42- 45 and include electrodeposition, sputtering, or chemical vapour deposition, none of which involves any form of pressing of powders.

The outer layer of the Winter *et al* device also does not disclose this feature of independent claim 1. In Winter *et al*, column 3, lines 22-26, the outer layer 32, is described as a wrought material. There is no suggestion in Winter *et al* that the outer layer may be prepared from a "*pressed particulate composition*" as required in Applicant's amended claim 1.

Therefore, neither the inner layer or outer layer, whether considered in isolation or as a combination of the two can be said to provide a liner that is formed from a pressed particulate composition, and thus, Winter *et al* does not read onto Applicant's amended claim 1.

B. Claims 1-4, 13 And 19-27 Are Novel Because Winter Does Not Disclose A Liner Including "At Least Two Metals"

Claims 1-4, 13 and 19-27 are independently novel because Winter *et al* does not disclose a layer that includes more than one metal or "at least two metals" as required by claim 1. This is because there is no disclosure in Winter *et al* of metal powders being consolidated to form the

liner, as required by Applicant's amended claim 1. Therefore, independent claim 1 and claims 2-4, 13 and 19-27 are novel because Winter *et al* does not disclose this feature.

C. Claims 1-4, 13 and 19-27 Are Novel Because Winter Does Not Disclose A Liner Made Of Metals In Portions Sufficient To Give An Electron Concentration Of 1.5

The Applicant additionally wishes to point out to the Examiner that there is no specific disclosure in Winter *et al* of *"two metals [which] are provided in respective proportions calculated to give an electron concentration of 1.5"*. The mere mention of "alloys thereof" in col 3, lines 36 to 39, does not disclose or even provide any guidance to the skilled person that the desired electron concentration must be selected from 1.5. The Applicant believes that amended claim 1 is novel over Winter *et al.* for at least this reason.

D. Many Dependent Claims Are Independently Novel

Applicant also believes that claim 3 is independently novel because there is no specific disclosure of palladium in the list of metals disclosed in col 3 lines 20-45.

The Applicant further believes that claim 13 is novel. The examiner takes the position that Winter *et al.* at col 4, lines 50-66 discloses the grain size set forth in claim 13. However, the grain sizes disclosed in Winter *et al* refer to the size of the nucleated materials that are formed as a result of the deposition process. There no disclosure of powdered metals being present in the manufacture of the liner in Winter *et al.*

The Examiner also alleges that claims 19 and 20 are anticipated by Winter *et al,* in col 3, line 20-45. Applicant's claim 19 requires that there must be at least one metal that is not capable of an exothermic reaction within the reactive composition. Winter *et al* is completely silent on the use of a reactive composition and therefore all components cited in Winter *et al* can only be inferred to be inert. Therefore, there is no disclosure in Winter *et al,* or even the merest hint, of preparing a reactive composition from a pressed particulate composition of at least two metals, capable of undergoing an exothermic reaction, and furthermore, no guidance that a further inert metal may be added to said reactive composition. Furthermore, Winter *et al* in col 3, line 25, specifically states that the inner layer 30 is substantially homogenous, and so there is no suggestion in Winter *et al* that the inner layer (the one which ultimately forms the jet, col 3, line 28) may comprise more than one metal.

The shaped charge perforators as claimed in claim 21 and 22, that comprise said novel liners, and additionally perforation guns claim 26, comprising said shaped charges must also be considered novel by inclusion of said novel shaped charge liners.

The Applicant believes claim 1 is novel over Winter *et al*, for the many reasons recited above and that all claims dependent thereon must also be considered novel by way of their dependence.

IV. TRAVERSE OF THE OBVIOUSNESS REJECTION

The Examiner has rejected claims 5-12 and 28 for obviousness over Winter *et al*, as applied to claim 1 above, and in view of Collins *et al* (US6371219). As an initial matter, each of the rejected claims are patentable buy virtue of their dependence, directly or indirectly, upon independent claim 1 which is novel for the many reasons recited in Section III above.

Moving on to the merits of the obviousness rejection, Collins *et al* is directed to a shaped charge liner fabricated from a metal loaded polymer matrix. In Collins, col 1, lines 56 to 57, the metal loaded polymer matrix is prepared in the form of a moulding. There is no specific disclosure in Collins that the polymer loaded metal is prepared into the shape of the liner using a consolidation technique, i.e. that it is prepared from "a pressed particulate composition" as required by Applicant's amended claim 1. Indeed Collins in col 1, line 26, states that green or partially sintered metal powders are one method to preparing liners and then goes onto state in col 3, lines 30-36, that this production method is expensive, time consuming and undesirable. Therefore, Collins clearly teaches the skilled person away from considering particulate liners that are formed from consolidated loose powders. Therefore the skilled person would not be minded to combine the teachings in Collins with the teachings in Winter *et al*.

The Examiner further suggests that it would be obvious to take the device of Winter *et al* and add the binder as disclosed in Collins. The Applicant respectfully disagrees. The Winter *et al* device does not disclose the use of loose powders to form a "pressed particulate composition", as required by Applicant's amended claim 1. Instead, as already mentioned in the above novelty section, Winter *et al* discloses the use of a deposited liner, and therefore, there would be no advantage to introduce a binder into a deposited composition. Winter *et al* deliberately selects the method of deposition, so as overcome the problem of discontinuities in the grain structure. The

skilled person would therefore not be minded to add a binder, such as those in Collins, during the process of deposition, as it would only serve to increase discontinuities in the deposed grain structure, which is the very problem that Winter *et al* sets out to overcome.

Furthermore, Winter *et al,* col 3, line 25, specifically states that the inner layer 30 is substantially homogenous. Therefore this would also teach the skilled person away from adding any material, including a binder, to the inner layer, as it is specifically taught to be homogenous. Therefore the addition of a binder as claimed in Applicant's claim 5 and 6, is non-obvious over Winter *et al* in light of Collins *et al.*

The types of binder as claimed in Applicants claims 7 to 8 and specific ranges 11-12 are non-obvious and patentable at least by way of their dependence on claim 5. The Applicant wishes to point out that there is no specific disclosure in Collins of a binder or "matrix" that is an energetic polymer, i.e. one which provides energy to a detonative output, as claimed in Applicant's claim 9 and 10. Furthermore, there is no guidance or even the suggestion in Collins that the binder may advantageously possess an energetic output, therefore the skilled man would not be minded to incorporate an energetic polymer as a binder, as claimed in Applicant's claims 9 and 10.

The Examiner suggests that claims 14-17(14-15?) are unpatentable over Winter *et al* as applied to claim 13. As discussed in Section III above, the grain sizes disclosed in Winter *et al* refer to the size of the nucleated materials that are formed as a result of the deposition process. There is no disclosure of powdered metals being present in the manufacture of the liner in Winter *et al*. Therefore the particle sizes in claims 14 and 15 cannot be considered obvious choices, as they refer to powdered materials.

The Examiner suggests that claims 16 and 17 are unpatentable as the liner thicknesses would have been obvious selections. However, neither Winter nor Collins provides any guidance on the preferred thickness of the liner and so there is insufficient reasoning provided by the Examiner to show that the thickness was obvious.

The Examiner suggests claim 18 is unpatentable over Winter *et al* in light of Delacour. Delacour discloses col 3, line 8-11 that the coating 7 is added over portions of the surface of the liner 5, Applicant considers that coating 7 does not form part of the liner. The liner 5 itself is clearly indicated to be uniform in its cross section in Figure 4.

Delacour in, col 3, line 15, discloses discrete portions of material 13 that are added over parts of the surface of the liner 5, Applicant considers that these portions 13 are not part of the liner. There is no indication or guidance that the liner 5 in either Fig 4 or 6, may be non-uniform across its surface area.

The Applicant considers amended claim 1 and claims dependent thereon, are both novel and inventive over Winter, Collins and Delacour, whether read in combination or isolation.

CONCLUSION

All pending application claims are believed to be patentable for at least the reasons recited above. Favorable reconsideration and allowance of all pending claims is, therefore, courteously solicited.

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Date: July 7, 2009

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312-913-2123